Three major techniques are used for needle biopsy of the thyroid gland. Experience leads to individual preferences and the efficacy of different techniques remains somewhat controversial. Tissue that is representative of the thyroid abnormality must be obtained. *Fine-needle aspiration biopsy* can be used in nearly all situations, is best accepted by patients, has high reliability in experienced hands and is gaining in popularity. This technique requires a knowledgeable cytologist. *Large-needle aspirates* provide cellular material for *histologic* study. Experience indicates that the results of this procedure are less dependable than those from fine-needle aspiration. *Core needle biopsy* (usually with a Silverman or a TruCut needle) provides tissue for histologic study. For the latter technique, the thyroid nodule should be more than 2 cm in diameter (1.5 cm if easily accessible). This requires a small skin incision, is a slightly more complicated procedure than fine-needle aspiration and is less acceptable to patients. Core needle biopsy is highly (90%) reliable and appears to be most useful in cases that remain a diagnostic problem after fine-needle aspiration biopsy; as such, it is decisive in 15% to 20% of cases of thyroid nodules.

Fine-needle aspiration biopsy permits immediate assessment of virtually all thyroid nodules and is our preferred basic technique. Strict criteria for the adequacy of specimens are mandatory, with the presence of clumps of normal cells in at least two slides required to permit a report of a benign lesion with the fine-needle technique. Aspirates are obtained from at least six different locations of the nodule. We classify results as benign, inadequate, indeterminate and malignant, with appropriate characterizations for each category.

Cystic degenerating thyroid nodules commonly result in an inadequate specimen from needle biopsy. Biopsy by fine-needle aspiration or core needle biopsy of the solid component of such lesions following aspiration of fluid may produce an adequate specimen.

Indeterminate specimens from needle biopsy usually indicate a cellular lesion that cannot be identified as either a benign cellular adenoma or low-grade follicular carcinoma of the thyroid gland. For this and similar difficulties, including Hürthle cell lesions, core needle biopsy provides clarification in some cases.

The results of fine needle biopsy of the thyroid gland can be summarized as follows:

False-negative	2% to 4%
False-positive	0% to 3%
Inadequate	3% to 11%
Indeterminate	17% to 30%
Carcinoma in indeterminate cases	20% to 60%

Complications from fine-needle aspiration biopsy are negligible and consist primarily of minor bleeding. Injury to adjacent structures and more serious bleeding rarely occur after the use of larger needles. The frequency of these complications is related to the skill and experience of a physician and the location of a lesion. Seeding of neoplastic cells has been reported to be extremely rare and restricted to the use of large needles.

Needle biopsy is cost effective compared with other diagnostic studies and management plans for thyroid nodules. Its capacity for selectivity of treatment frequently results in twice the frequency of thyroid carcinoma in patients undergoing surgical procedures for thyroid nodules in practices using needle biopsy compared with previous experience when the procedure was not utilized.

Needle biopsy of the thyroid gland must be used as only one important tool. An operation is recommended for cases in which the study results are positive, indeterminate or inadequate with other factors supporting a surgical procedure, and for cases of large benign solid thyroid nodules. Needle biopsy findings are significant in preoperative discussions with patients and in directing the extent of the operative procedure. For benign cases, medical follow-up and periodic repeat biopsy are justified.

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Use of Computed Tomography in Cases of Blunt Abdominal Trauma

THERE HAS ALWAYS been a need for a sensitive discriminating means of diagnosing intraperitoneal and retroperitoneal injury following blunt trauma. The primary need for such a diagnostic test is to avoid missing an injury, which can often be fatal or result in serious disability. This is particularly true in a shocked or unconscious patient. A secondary need is to avoid laparotomy if there is minor, insignificant or absence of injury. It is far better to err on the side of laparotomy than not, however. I know of no patient who died from diagnostic laparotomy for blunt trauma, but I do know of several instances wherein a patient died because laparotomy was not done.

For the past 15 years, the mainstay of diagnosis in a stable trauma patient with a possible abdominal injury has been peritoneal lavage. It is relatively easy to do and is fairly specific and sensitive. Its disadvantages are that it does not identify retroperitoneal injuries and, in some instances, it may be too sensitive. For example, the results may be "positive" with relatively minor liver injuries. Nevertheless, peritoneal lavage is still widely used and is still the diagnostic study of choice in many centers.

Computed tomography (CT) has advantages over peritoneal lavage in that it is both qualitative and quantitative. CT shows specific organ injury and quantitates relative blood loss, thus allowing a surgeon to use judgment on the need for laparotomy. In addition, CT is capable of diagnosing retroperitoneal injuries, specifically those involving the pancreas, duodenum and kidneys. Injuries to the diaphragm, small bowel and colon can be detected by both CT and peritoneal lavage, but both tests can also miss these injuries.

There are certain caveats and disadvantages with CT. Optimally, CT of the abdomen for blunt trauma should be done with a relatively recent generation CT scanner because of the

improved resolution. In addition, double contrast, with media given by mouth and by vein, will enhance diagnosis. Interpretation requires a senior radiologist; in our institution, the radiology residents and surgeons miss 15% of injuries. CT should *not* be done on an unstable trauma patient. Like peritoneal lavage, CT should not be overused or abused. It should not be done in a case of obvious blunt abdominal trauma nor as a substitute for a thorough clinical examination by a general surgeon. Finally, CT may be slightly more expensive than peritoneal lavage, but because of the oversensitivity of peritoneal lavage, this is probably offset by reducing the need for laparotomy.

In summary, CT represents a new diagnostic method for evaluating intraperitoneal and retroperitoneal injuries. It is both specific and sensitive. I anticipate the introduction of newer imaging modalities in the near future for evaluating cases of blunt abdominal trauma. For the present, however, CT represents the state of the art.

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Liver Transplantation

THE FIRST human liver transplant was carried out by Thomas Starzl, MD, in 1963. The initial liver transplant procedures done on the West Coast were done in the late 1960s at University of California medical centers by Fonkalsrud at Los Angeles and DeLorimier at San Francisco. Following these initial transplantation efforts, interest waned in the procedure. Throughout the 1970s, the world's experience in liver transplantation was limited to the isolated efforts of Starzl in the United States and Calne in England.

Since the advent of cyclosporine, considerable interest has been generated in liver transplantation. Active liver transplantation programs exist in at least 11 centers in the US, and a similar number in Europe and Asia. In the West, active liver transplant programs now exist at the University of California, Davis, in Sacramento, at UCLA and in Phoenix.

One-year patient survival rates in the precyclosporine era were from 30% to 40%. Since the advent of cyclosporine, one-year patient survival rates of between 50% and 75% have been reported. At present, the highest survival rate occurs in the pediatric population in which biliary atresia is the most common indication. It is now clear that mortality is also related to the degree of hepatic, renal and pulmonary failure present at the time of transplantation.

The most common indications for hepatic transplantation in adults include nonalcoholic cirrhosis, primary liver cancer, primary biliary cirrhosis and sclerosing cholangitis. Common indications in children include biliary atresia, α_1-antitrypsin deficiency and inborn errors of metabolism. At present, the guidelines for the timing of hepatic transplantation are poorly defined and vary widely depending on an individual patient and the diagnosis.

The resources and institutional support required for a successful liver transplantation program are considerable. An institution that initiates a liver transplant program must make a major commitment to its support. In addition, liver transplant programs must have physicians who are experienced in hepatic transplantation and who are expert in the fields of hepatology, pediatrics, intensive care, infectious disease, pathology, anesthesiology and immunology. Of particular importance is the role of the blood bank and the availability of social and psychiatric services.

Hepatic transplantation programs should be initiated under the guidance of a supervisory committee consisting of both medical and lay persons with expertise in the fields of hepatology, transplantation and ethics. This committee should review each candidate before transplantation and also review the quality of health care delivery.

Funding resources have been a continuing problem in liver transplantation. The estimated cost of a liver transplantation and initial hospital care is approximately $125,000, with an estimated cost of $25,000 a year after the initial hospital admission.

Liver transplantation represents a viable new means for treating patients with end-stage liver disease. For the foreseeable future, liver transplantation efforts will be limited to a small number of institutions that are willing to meet the tremendous resource commitment that is required to achieve optimal success levels. As limited numbers of hepatic transplantation programs will exist, patients will continue to be referred from a large geographic area, and local physicians will continue to become increasingly involved in their preoperative and postoperative care.

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Surgical Treatment of Morbid Obesity

MORBID OBESITY is a disease that leads to many other diseases associated with a compromised way of life, longevity and mortality. There is no drug therapy or medical regimen that is recognized as a standard therapy for its successful treatment. The surgical procedures presently in vogue involve reducing or restricting the gastric reservoir. Intestinal bypass has proved unsatisfactory because of its long-term failure rate and high association of untoward side effects. Various stapling techniques have evolved over the past ten years in an effort to provide an easy, satisfactory technique that will be permanent. Stapling the stomach into a small reservoir with a controlled outflow has been the aim. Success rates have been reported at higher than 85%. A long-term slow regain of weight in some patients undergoing staple procedures has been recognized. This has been due to some enlargement of the reservoir, the outlet of the stomach or pulling out of the staples.

The search for a simple, permanent surgical technique continues. Various banding techniques, with and without the use of staples, are being proposed because of dissatisfaction